U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF ANIMAL INDUSTRY.—Bulletin No. 70.

D. E. SALMON, D. V. M., Chief of Bureau.

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THE MILK SUPPLY

OF

TWENTY-NINE SOUTHERN CITIES.

BY

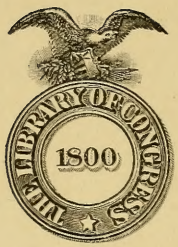
C. F. DOANE, M. S.,

Special Agent of Dairy Division, Bureau of Animal Industry.

WASHINGTON:

GOVERNMENT PRINTING OFFICE.

1905.



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LETTER OF TRANSMITTAL.

U. S. Department of Agriculture,
Bureau of Animal Industry,
Washington, D. C., February 17, 1905.

Sir: I have the honor to transmit the accompanying report upon "The Milk Supply of Twenty-nine Southern Cities." This report was compiled by Prof. C. F. Doane, M. S., professor of dairy husbandry and bacteriology in the Maryland Agricultural College, while acting as special agent for the Bureau of Animal Industry, under the direction of Maj. Henry E. Alvord, late chief of the Dairy Division.

It was found in the preparation of Bulletin No. 46, Bureau of Animal Industry, "The Milk Supply of 200 Cities and Towns," that the Southern cities had some peculiar problems and conditions. This led to the investigation as presented in this report, which adds much valuable information to the present knowledge of the subject of milk supply in American cities. I therefore recommend that this manuscript be published as Bulletin No. 70 of the series of this Bureau.

Respectfully,

D. E. Salmon,
Chief of Bureau.

Hon. James Wilson,
Secretary.

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State and city or town.	Population in 1900.	Daily consumption in addition to family cows.	Number of cows kept in city.	Retail price per quart.	Retail price per gallon.	Price per gallon paid to producers.
Alabama:		*Gallons.*		*Cents.*	*Cents.*	*Cents.*
Birmingham	38,415	800	500	6–10	20–25	20
Mobile	38,469	400	.....	8–10	25–35	20–22½
Montgomery	30,346	600	350	6¼	15–20	.....
Florida:						
Jacksonville	28,429	500	.....	8–10	25–30	.....
Pensacola	17,747	400	Few.	10	35	.....
Georgia:						
Atlanta	82,872	5,000	.....	7–10	20	15–20
Augusta	39,441	600	500	6–10	20–30	.....
Macon	23,272	800	.....	6– 8	20–25	.....
Savannah	54,244	.....	.....	7– 8⅓	25	.....
Louisiana:						
Baton Rouge	11,269	150	.....	6¼– 8¾	25	.....
New Orleans	287,104	12,970	[a]6,723	7½–10	20–25	10–16
Mississippi:						
Meridian	14,050	250	.....	7½	25	.....
Natchez	12,200	300	.....	8–10	25	.....
Vicksburg	14,834	350	.....	8–10	25–30	.....
North Carolina:						
Greensboro	10,035	200	325	6– 8	17–20	.....
Raleigh	13,643	150	300	7– 8	20–25	.....
Wilmington	20,976	200	400	10	25	.....
South Carolina:						
Charleston	55,807	300	750	8–10	24	16
Columbia	21,108	250	.....	7–10	24	.....
Spartanburg	11,395	.....	.....	6	20	.....
Tennessee:						
Chattanooga	30,154	2,000	Many.	6– 7½	16–20	15
Knoxville	32,637	1,000	.....	6– 8	20–25	.....
Memphis	102,320	8,500	.....	6¼–10	11–20	11–15
Virginia:						
Danville	16,520	350	.....	8½–10	20–24	.....
Lynchburg	18,891	400	200	6– 8	16⅔–25	.....
Norfolk	46,624	2,000	.....	8–10	20–25	20
Portsmouth	17,427					
Richmond	85,050	5,000	500	6– 8	25	15–17
Newport News	19,635	.....	.....	.....	.....	.....

[a] Not including 18 herds just outside the parish of New Orleans.

Cream.		Ice cream per gallon.	Butter-milk per gallon.	Amount of milk sold in bottles.	Amount of milk cooled before selling.	Longest distance shipped.	Page on which statement is found.
Per cent fat.	Price per quart.						
	Cents.		*Cents.*			*Miles.*	
25	40	$1.50	10	Nearly all	All	25	33
40-50	40-50	1.50-2.00	20-25	do	Nearly all		34
25	40	1.25-1.50	10-15	Small part	Small part		32
		1.50		Part	Part		31
25	40-50	2.00+	25		Very little		32
25	40	1.20-3.20	12½	Nearly all	Large part	35	28
25	40	1.50	12-15	do	None		30
25	40	1.25-2.00	10-15	Part	Nearly all		30
				Some	Some		29
	40			None	Almost none		38
	30-40	1.50-2.00		Small part	Small part	40	36
	30-40	1.50		Part	Small part		35
	40	1.25-3.00			Almost none		35
	30-40						34
	25	1.00	10	Nearly all	Nearly all		25
20-30	25-40	1.00-2.00	10	Small part	Some		25
35	60	1.50	20	All	Part		24
18	25	1.00-2.00	20	Part	Small part		26
30	50	1.60	10		Part		27
		1.50-2.50					27
20	25	1.25		Part		60	40
	30	1.00-1.25		Small part	Part	20	40
30	25	80-1.00	10	Part	do		39
20	40		10-20	Half	do		23
		1.00		Nearly all	None		23
		1.00-4.00	20	Half	Some		21
25	30	1.25			Cooled at depot	15	20
					Part		22

THE MILK SUPPLY OF SOUTHERN CITIES.

By C. F. Doane, M. S.,
Special Agent of the Dairy Division, Bureau of Animal Industry.

THE DAIRY SITUATION IN THE SOUTH.

The observations reported herein were made in order to obtain information concerning various conditions affecting the milk supply of representative Southern cities.

The lack of knowledge concerning the milk supply of Southern cities, compared with cities of the same size and importance in Northern States, is very likely due to two causes. In the first place, the dairy industry in the South has not in any of its branches attained the importance that it has in the North and West, and therefore has not invited the same amount of attention that it has in the North. Again, a large amount of the information on dairy subjects in the North has been disseminated by the agricultural press, and this has naturally aroused interest in the industry; but the South does not have many agricultural papers, and is therefore deprived to a large extent of this excellent method of promoting dairy knowledge.

As might be expected, there is a wide difference in the way dairying is conducted in the South as compared with the North. The climate and the differing systems of agriculture are very likely the cause of this. The Southern farmer cultivates large areas with much hired help. The Northern farmer cultivates small farms and, with the help of his family, does the greater part of the manual labor. These small farms have naturally led to intensive farming in the North, and in consequence the live-stock industry, including dairying, has been pushed to a prominent place. The character of the soil of the North, the short growing season, and the small farms have together served to make stock raising one of the most profitable of occupations, and it has become one of the best-known branches of agriculture in that part of the country. In the South, however, dairying is not especially regarded as a branch of agriculture. It is seldom carried on there in connection with other farming operations. In fact, in very few cases is any attempt made to raise all or even a small part of the feed con-

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sumed by the cows. This condition has led to the keeping of cows in or near the cities on very small areas of land; and even where the herds are kept a few miles out from the cities, where an abundance of cheap land is available, the same general plan is followed of keeping cows in a small area, where no pasture is provided and feeding is exclusively on commercial foodstuffs. This practice is not calculated to result in the greatest profits. In fact, profitable dairying in any section depends upon the production on the farm of the feed consumed by the dairy herd. The Southern dairyman, as a rule, buys all his feed. This consists mostly of cotton-seed products, which are of doubtful value when fed in great quantities to the exclusion of other food products. Cotton-seed products are, of course, cheaper in the South than in any other portion of the country; and, in a few localities, where abnormally low prices have prevailed for the hulls, they evidently make as cheap a ration as could be purchased in any locality, not excluding the Middle West, where forage crops sell at a low figure. Many dairymen, however, give other feeds than cotton-seed hulls, and their cost becomes very high, for the South does not raise all of the forage needed, and consequently Northern feeds must be obtained. It is difficult to understand why the dairymen do not raise their feed. The system of dairying that is carried on in the North, if adopted, could not fail to be more profitable to the producer and more healthful for the consumer. The amount of forage that can be raised on an acre of land in most of the Southern States is beyond the conception of the Northern farmer. The growing season is almost twice as long as in the North, and, moreover, the soil under proper condition of tillage, where fertilizer is applied, responds wonderfully. The land itself is cheap and usually easily tilled, and forage crops of almost all kinds can be produced cheaper than in the North. Nothwithstanding these facts the dairymen of the South pay to the Northern producer a profit plus the cost of shipping such bulky freight a long distance. In other words, the Southern dairyman is wasting his fertilizer and the natural advantages of soil and climate. Moreover, the cattle would be healthier if they could have pasture or plenty of green feed, they would produce more milk, and the entire industry would be placed on a more satisfactory basis for producer and consumer.

CONSUMPTION OF MILK IN SOUTHERN CITIES.

Comparatively little milk is consumed in most Southern cities. The amount per capita in Richmond is not quite one-half pint, which is about as high an average as in any Southern city, while at Pensacola it is as low as one-fifth pint, and in Mobile less than one-tenth pint. These are the only cities where anything like approximate figures of the amount of milk consumed could be secured. In Richmond a very

careful and businesslike dairyman had collected the figures of the total milk sold. In Mobile and Pensacola the amount of the business was so small that it was not difficult to secure satisfactory figures. Richmond did not have enough family cows to influence the average figures greatly, while in Pensacola no family cows were kept, and in Mobile not a large number.

What is true of the consumption of milk is even more true of the consumption of cream. One of the most notable features in the sale of milk products is the exceedingly light sale of cream. It can be said that practically no cream is sold in the South for use as it is used in other parts of the country. To buy cream for use in coffee or with fruit is unheard of. The greater part of the cream sold carries a high percentage of fat and is used for whipping. The remainder is used for making ice cream.

To account for the small quantities of milk and the smaller quantities of cream consumed is a most difficult undertaking. It may be that the people do not use these products because they are unable to secure them, which would seem to be the case in some of the cities considered. On the other hand, they refrain from buying in some instances when the dairymen have enough and to spare, this being evidently the case in Charleston and a few smaller places. This lack of desire to buy may be because the people do not like milk to the extent that they do in the North, or are suspicious of the kind of milk sold. Most of the physicians, especially the younger men, recognize that the milk offered for sale is not of good quality and, as a consequence, few invalids receive milk, and a surprisingly large proportion of the infants are fed on condensed milk. So universal is the practice of feeding condensed milk that many physicians expressed surprise when told that fresh milk was much preferred for infant food in other parts of the country, and that the use of condensed milk for this purpose was very exceptional and was usually severely criticised.

Were the people able to get a high grade of milk in quantities desired throughout the year it is very likely that the consumption would gradually increase. This would be especially true at Pensacola, where the supply is short of the demand. It is true that in most cities dairymen find little trouble in disposing of all the milk produced during the greater part of the year. For at least half of the year there appears to be a distinct shortage in the supply. On the other hand, in the spring there is a surplus. Milk producers in the South, as elsewhere, seem generally to think that the spring of the year is the only time when a cow should come fresh. As a consequence the most milk is produced during the spring and summer, when the best customers are away from the cities, whereas when the greatest quantity

of milk could be sold the cows are not producing sufficient to supply the demand. There can be no doubt that these periods of short supply decrease the amount of milk consumed, even in periods of plenty, for the people get into the habit of doing without milk. For instance, at Spartanburg, a city of over 11,000 inhabitants, there was but one dairy and that of only 25 cows, and the owner had a hard time disposing of all his product, although it is evident that he was selling good milk. In fact, this city once had three dairies, but two were closed out because they could not get enough business to pay. There are cities where all the milk is produced that can be disposed of, as in Charleston, where dairymen, who are doing a good business and handling a good grade of milk, stated that no more milk could be sold in the city than is now being consumed. This is also true of many of the smaller cities.

It is a matter of some speculation as to the future course of the dairy industry in Southern cities. Some of the leading citizens always said on inquiry that there was a good opening for a first-class dairy. While there may be some question as to the reason for the small consumption of milk, there can be none concerning the even lighter use of cream. The light cream trade is indicated by the fact that housekeepers can not secure as much as they would use. Moreover, the shortage has tended to very high prices, comparatively, as 40 cents a quart retail appears to be the usual price. In fact, cream is a decided luxury. A considerable quantity of cream is shipped south from Tennessee and the mountain district of North Carolina. Little cream is used in making ice cream, and that, with few exceptions, is shipped from considerable distances.

Ice cream and buttermilk are two dairy products in which a very heavy business is done in the South, except in the Mississippi Valley States. This is very likely due to climatic conditions, as hot weather, of course, is always conducive to a brisk trade with ice cream, and the human system craves the acid of the buttermilk under the same conditions. The ice cream, as a rule, is not of the best quality, because the necessary cream, as heretofore stated, can not be obtained for making it, and to use imported cream would be too costly. Most of the ice cream is made from whole milk, but condensed milk and cream are not uncommon in its manufacture. In some cities enormous quantities are made from whole milk and sell at $1.50 to $2 per gallon, whereas ice cream makers in the North make a good profit in wholesale cream with 10 to 15 per cent of fat at $1 per gallon. In a number of cities where there is a particularly small milk trade imported cream or condensed milk is used exclusively in the manufacture of ice cream. With these facts and comparative figures before us, it is easy to realize the demand for this article in the South.

It is likely that as much so-called buttermilk is consumed in the South as whole sweet milk. A person unacquainted with the true condition could hardly realize the great demand for this product. The writer sat in the office of a city dairy in one of the smaller cities of North Carolina and watched a steady stream of customers filing in, and nine out of every ten came with the purpose of getting buttermilk, though the proprietor said that it had been understood that no buttermilk would be available for a number of days. The price charged for this buttermilk is seldom below 12 cents a gallon retail, and it is usually 20 cents a gallon. It may well be asked how so much buttermilk is to be secured when so little butter is made. The answer is, that practically all of this buttermilk is simply skimmilk allowed to sour and then churned for a few minutes. Sometimes customers demand a few granules of butter as an evidence of good faith, and this is met by churning a very small portion of cream in a glass jar, allowing the butter granules to come very fine, and putting this butter into the churned milk. The deception seems to answer all requirements. Buttermilk from churned cream is simply the sour milk from which the fat has been removed. The fact that it was allowed to sour before removing the fat influences the character or the quality of the buttermilk not a bit. As buttermilk is such a desirable article of food in the South, the practice of churning sour skimmilk should be encouraged rather than discouraged. There may be some doubt as to the propriety of calling the product buttermilk, but to all intents and purposes it is buttermilk.

It has already been noted that the heavy buttermilk trade and ice cream trade in a measure decreases in the cities in the Mississippi Valley. There seems to be no explanation of this, as the climate and other conditions are the same, so far as observed. Tastes and practices are sometimes sectional, but this is hardly a satisfactory explanation of the existing condition.

HOW THE MILK IS HANDLED.

Very little milk is shipped for any distance to Southern cities, as has been mentioned. The greater part of it is produced in the immediate neighborhoods of the cities—so close that the railroads are seldom used in transporting it—and much of it is produced by herds kept within the limits of the cities. The fact that no milk is shipped for a distance does away with the very important problem of the handling of the milk by railways, but, as we shall see, it has led unnecessarily to a considerable evil. Milk is retailed usually directly from the farm. This may or may not be an advantage. Milk that is delivered by the producer ought to reach the consumer sooner after

milking than if it had to go through other hands; but the city dairies which buy from the producer and sell to the consumer, when rightly conducted, put the milk through a process that often improves its keeping qualities. As there are few city dairies, the selling of milk to small consumers by grocery stores is very limited, and the cities are to be congratulated on escaping this evil, which is the greatest curse of the milk business in large cities of other sections.

The general plan of the milk business is about as follows: The cows are milked very early in the morning and afternoon, so as to get the morning milk delivered in time for breakfast. The milk may or may not be strained. In some instances it is run over a cooler of the truncated cone style. From observation, this cooling was so inefficient as to be useless in most instances. This warm milk is then bottled or put in cans having no device for protecting the afternoon delivery from the fierce heat, and is thus carried to the consumer. The consumer has very little knowledge of how to care for the milk. Usually this matter is left to a servant, and no attempt is made to keep it in a cool place. Most Southern households are liberal users of ice. The kitchen refrigerator is common, but it is not utilized for keeping the milk. Here is where the city dairy or depot might be an influence for good, as the milk would be reduced to an ice temperature and would have its period of usefulness lengthened by several hours. It would thus reach the consumer in better condition, even if it were several hours older, than that delivered by the producer.

A number of cities are discussing the idea of pasteurizing the milk supply, and two that were visited had plants for this purpose.

Practically all of the milk sold to the city consumers is delivered from wagons. Very little hand trade or push-cart trade is done, Charleston being the exception to this general statement. The wagons are, of course, of almost every description and condition, although there is a particular style that is in general use. Some milk for hotel use was brought from a distance in heavy farm carts, and small producers generally used a covered spring wagon. Considering the fact that there is no strenuous competition and no regulations, the wagons, on the whole, were quite good and kept in good condition.

MILK AND DAIRY INSPECTION.

A number of cities that were visited regulated the milk supply to some extent. The regulations were copied largely from those of Northern cities. This inspection service has not been in force more than a few years in any of these cities, but the idea is being adopted by others very rapidly. The regulations affecting milk in some of these cities are very simple, and it appears that their simplicity gives

strength. The principal points of any good milk regulations can be covered in a few words: The milk must have a certain content of butter fat; no foreign substances may be added to the milk; stables and yards must be in a prescribed condition; cattle shall be in a certain condition of health—even tuberculin tested. These are given in the order of their importance as generally considered by city health authorities. Certain details are sometimes added for the purpose of facilitating the enforcement of these points or to make it more difficult for dealers to evade the law; but where this is carried too far more harm than good is done, and there is always a tendency in such instances to get so many regulations that none of them will be fully enforced.

As a rule, the ordinances relating to the milk supply of the cities visited are few and simple, but comprehensive. Moreover, it is very doubtful if there is any other section of the country where regulations in regard to milk are more consistently and rigidly enforced. This is done in the face of the fact that it is doubtful if a very few years ago one-fourth of the milk consumed in these cities was an honest product in every particular. The records of analysis made by city health officials before the adoption of milk regulations show a pretty bad state of affairs. Skimming, watering, and preserving were generally practiced. This information was gained by periodical visits to premises and by talks to sellers who gave all the evidence required of the efficiency of the inspection service, and in no instance was the word of officers in charge accepted as to what had been accomplished. Retailers, without exception, bitterly condemned the activity of the officials.

How the inspection has been made so effective may need explanation. As has been said, the regulations are simple and the work is new. As a rule, young men from agricultural or medical schools, with the new ideas in regard to the qualities of good milk, have been placed in charge of the work. A sufficient number of assistants is provided, and samples are taken often from every wagon. The percentage of fat required in the milk varies with different cities from 3 to 3.5 per cent. In one case only was there any statement by inspectors that this was higher than the producers could meet. This was at Jacksonville, Fla. As a rule, milk produced in the South is comparatively rich in fat. The inspectors at Memphis, Tenn., where samples were taken periodically at the barns, were of the opinion that a standard above 4 per cent could be enforced and no herd disqualified. The results obtained from some of these samples showed a very high percentage of butter fat for an entire herd. These high tests are very likely due to the fact that the Jersey blood predominates to a large extent in the South. At Jacksonville, however,

there is very little Jersey blood, the native stock making up most of the dairy herds. How the milk from these cows tests is not known to the writer, but it appeared from a few observations as if the low fat test of the milk sold in that city was very likely due to skimming or the addition of water.

It is doubtful if any appreciable quantity of milk that is sold in cities having inspection contains preservatives; on the other hand, it is doubtful if any city without inspection receives any great quantity of milk free from preservatives. The climate and the methods of handling milk give the producer an excuse, in his opinion, for using preservatives, and large quantities are undoubtedly used.

The inspection of stables is usually very strict, and it is very likely that the condition of the country-kept dairies around many of the cities is generally better than that of any city north of Washington, D. C. The frequent visits of the inspectors have had this effect. Stables whitewashed, well ventilated, free from dust and cobwebs, and with floors thoroughly cleaned are always to be found in the dairies supplying some cities.

A considerable number of Southern cities require an annual tuberculin test, but every city enforcing this requirement reports an unusually low percentage of reacting, or infected, cows. For instance, at Birmingham, Ala., and Norfolk, Va., less than 1 per cent was reported to have reacted. Birmingham is in an exceedingly healthy location, and the almost constant outdoor exercise of cattle in the Southern climate would tend toward a low percentage of tuberculous cattle; but Norfolk can not advance this argument. A great part of the Norfolk dairy cows are shipped from Baltimore. The dairy herds of Maryland have a high percentage of tuberculosis, and it is entirely improbable that none but healthy cows were shipped to Norfolk. In fact, the reports from all the cities showed such a low percentage as to bring the efficiency of the testing seriously into question by all scientists acquainted with the subject.

PECULIAR COAST CONDITIONS.

The seacoast cities present peculiarities and conditions not found in the dairy industry in any other part of the country. A number of the largest cities of the South are situated on the seacoast, and any problem peculiar to them is interesting. Most of these cities are built upon what was once the beach sand of the receding ocean. In many places these sandy coast plains stretch back for many miles from the ocean. They are covered by pine forests, but it seems that in many instances the forest growth has added very little to the fertility of the sandy soil; especially does this seem to be the case where the sand reaches to any depth. In such land, which makes up a large

area, the addition of manure or fertilizer is only of temporary benefit, as it very quickly leaches out of the surface layer and away from the roots of the growing plants. The rains are excessive at certain seasons of the year and aid in this leaching process. Occasionally a subsoil of clay is found at a few inches to 2 feet below the surface. Even with the clay subsoil it seems impossible to grow crops that are grown farther inland, but this is a condition that may be due, to some extent, to the lack of knowledge on the part of the farmers.

This naturally creates a problem of obtaining a cheap and satisfactory food supply for producing good milk. Under present conditions a large part of the rough feed is hay, shipped from the North and sold at a very high price.

Another problem is the effect of the hot, humid climate on the productive capacity of the cows. It was asserted by dairymen who were apparently capable of judging that cows brought from the interior to the coast shrank very materially in their milk yield after the first year. In a couple of instances the writer went over the situation very carefully with the owners and secured minute information in regard to feed and care. It certainly appeared that, aside from the fact that the cows seldom received green feed, they were in condition to give a maximum quantity of milk. With the combination of low yield of milk and difficulty in growing paying crops, these cities are certainly in a very poor way ever to secure an abundant supply of satisfactory milk.

SUGGESTIONS FOR IMPROVEMENT.

The necessities of the several cities are enumerated later on in the detailed discussion of their milk supply; but a somewhat more particular consideration is necessary regarding some features. The following two evils stand out as being characteristic of the dairy industry of the South:

EVIL OF KEEPING COWS IN THE CITY.

The first and greatest evil is that of the keeping of cows in small inclosures inside the city limits. As has been stated, a great proportion of all the milk sold is from dairies thus located; and, even where the herd is outside the city, it is kept under the same condition of close quarters and with no green feed. It is a little difficult to understand why these conditions are tolerated so generally as they are. In many places the city health boards are waging a vigorous war against the practice, but, as was stated, the interest of the health boards in the dairy business is new, while the keeping of cows

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in the city is long established. The manner of keeping the cows has such a firm hold on the people that years will be required to do away with it, though it is a menace to public health. Cows are naturally filthy, especially in wet weather, and are clean only so long as they are helped to be so. It is next to impossible to produce good, clean milk with herds kept under these conditions. By all means, all herds should be driven outside the limits of the cities and the family cow should receive the most careful attention. This would be no hardship to the dairymen, and would be a benefit to the city and the consumer. It is a mistaken idea on the part of dairymen that leads them to keep herds in the city. The greatest profit in dairying is on a farm where feed can be raised and the manure saved.

EVIL OF DELIVERING WARM MILK.

The other great evil of the business in the South is the delivery of warm milk. At the present time this is the fault of the consumers, who are the losers by the practice. The reasoning which leads to this practice is simple: Cows' milk spoils with age; when it is fresh it is warm; therefore if it is delivered warm it is fresh, otherwise it is not. The result is that during the summer very little milk reaches consumers that is fit for use or in condition to keep sweet for more than a few hours, even under the best treatment. This milk is three hours old on the average when it reaches the consumer. During the greater part or all of this time it has been kept at body temperature or has cooled very slowly from contact with air at a temperature little lower than that of the milk. Milk has to be drawn and handled under very cleanly conditions in order to keep it sweet for more than five hours at body temperature. Much of it will spoil in four hours. This being true, probably three-fourths of the time during which the milk would remain sweet has been lost because it was not cooled when it was drawn.

The afternoon's milking and delivery has particularly bad treatment. The cows are milked from 12 to 2 o'clock. The warm milk is bottled, and at about 3 o'clock the wagon starts on the delivery. The bottles are often exposed to a temperature of 100° F. Frequently the milk is directly in the sun. Is it any wonder that much of this milk is sour by the time it reaches the consumer?

Milk is constantly shipped to New York from a distance of more than 200 miles under conditions of temperature often as severe as that of the Southern States, and it reaches the consumer twenty-four hours old and in better condition than the warm milk delivered in Southern cities, which are within 3 miles of the place in which it is produced and within three hours from the time it is drawn from the cow.

Under these conditions of nearness of producer and consumer there

are possibilities of an ideal milk supply. This would not call for any great amount of labor on the part of the producer. In cities where milk regulations have already done so much, the one thing necessary is to cool the milk. Some dairymen already make some pretense at cooling the milk, but in very few cases is it of any benefit. The cooler used is one that requires ice to have any effect, and ice is not used. No attempt is made to replenish the water, which soon becomes warm. The type of cooler needed, and the only type which will do good service, is similar to a coil of pipe. The cold water flows constantly through the coil from the bottom to the top, and the warm milk runs in a thin film over the surface from the top to the bottom. The milk is in this way cooled to very near the temperature of the fresh water. With this type of cooler the milk can easily be cooled to 70° F. in any locality—often colder, depending on the temperature of the water. While milk at body temperature will hardly keep five hours, milk cooled immediately to 70° F. will keep more than twelve hours; at 60° F. it will keep more than two days, and at 50° F. a considerably longer time. It should be possible where ice is used for domestic purposes to deliver milk that would keep for table use until the next morning. This would do away with the early milking, which is very objectionable, and it would make one delivery a day sufficient. This warm-milk evil is far worse than any of the conditions opposed by city health boards. It would be very easy to remedy this evil, and with the present knowledge of handling milk there is no possible excuse for its continuance.

PASTEURIZATION.

As has been stated, there is a tendency of public opinion to favor pasteurization of milk. Pasteurization as applied to milk has been advocated for about ten years, but, for reasons concerning the machinery needed, it is only within the last five years that it has been applied to a general milk supply. It can serve two purposes only in any locality: One purpose is to kill the disease germs present, and the other is to add to the length of time that the milk will keep. Of the disease germs, the only one at all prevalent in any milk supply is the one causing tuberculosis. In exceptional cases other disease germs may be present, and a few outbreaks of typhoid fever have been traced to the milk consumed.

As regards the increased keeping qualities of the milk, there is ground for possible difference of opinion. Pasteurization, of course, kills a large percentage of the germs present, and, when rightly done, without doubt adds to the length of time the milk will be palatable. The word palatable should be emphasized. Two points need to be brought out here: Pasteurization, when applied to the purpose of keeping the milk sweet for any length of time, simply serves, as a

rule, to cover up dirty treatment and poor care of the milk. Furthermore, pasteurization, to be effective, must be carefully done, giving every attention to the detail of heating to the right temperature and cooling quickly to a low temperature. When this is not done it is worse than useless. Now, on these grounds, when applied to milk shipped from long distances and produced on farms far beyond the eye of the dairy inspector there is a chance that pasteurization may serve a useful purpose. But with the dairies furnishing the milk so close to the city that the inspector may make occasional visits, and with all details so thoroughly under the care of the health board, there is no need for pasteurization, and the cities that undertake it will give it up in disgust in a very few years.

DETAILS OF THE MILK SUPPLY OF THE CITIES.

In the following pages the cities are treated individually regarding details of the milk supply. The population given is that of the last census. The estimated amount of milk sold is based usually on the number of cows, though, in a few instances, the applications for license to sell milk were used as a basis. The estimate of the number of family cows was either secured from responsible citizens or based on tax returns. The figures are given for what they are worth, for either source mentioned was far from correct. In only one city, Charleston, had an actual count of cows been made. It would have been interesting to give the amount of milk consumed per capita, but owing to the very large and indefinite proportion of family cows such figures would be valueless.

Richmond, Va.

Population, 85,050. Amount of milk sold daily, exclusive of that produced by family cows, 5,000 gallons. Perhaps 500 family cows are kept in the city.

The following are the prices for dairy products sold in the city: Milk retailed to consumers, 6 to 8 cents per quart, the greater part selling for 7 cents per quart; milk in gallon lots to hotels, restaurants, etc., 25 cents per gallon; price paid for milk to producers by dealers, 15 cents per gallon in summer, 17 cents per gallon in winter; cream containing 25 per cent of fat, 30 cents per quart retail, ice cream made from 20 per cent cream, $1.25 per gallon.

Richmond is the only city south of the Potomac with a milk supply handled in any manner similar to that of the larger Northern cities. It is the only one of the Southern cities which has a large city milk depot, handling the greater part of the milk consumed by the inhabitants. The city has two such establishments owned by private individuals. One of these depots drives twenty-five wagons and does a business comparing favorably in extent with the dairies of Northern cities. In the general plan of handling the milk and in modern improvements these two dairies are equal or superior to the greater number of similar establishments in the North. The milk is handled much the same, though the locality influences this to some extent. No milk is shipped a greater distance than 15 miles, the greater part being produced by herds kept within

driving distance of the city.[a] The farmers milk very early in the morning and afternoon and deliver the milk to the depots as soon as possible without cooling. Here it is immediately run over coolers, the temperature being reduced to below 50° F. The morning's milk is delivered in the afternoon and the evening's milk in the morning, the milk being at the time of delivery almost 8 hours old in one case and 15 hours old in the other. This is a much shorter period from producer to consumer than will be found in most Northern cities, and is due to the fact that the producers live within delivering distance of the city. As the milk is comparatively well handled after reaching the city dairy, the consumers should receive a very good article.

In regard to the rest of the milk, delivered direct from the farms to the consumers, not so much can be said. The recently established milk inspection insures good quality in composition, but it is very likely, as regards the sanitary conditions of the stables and handling of the milk before it reaches the consumer, that there is much to be desired, as is the case in every city. It is likely that, as the inspection becomes more thorough, the general condition of all stables will be much improved. Perhaps the greatest abuse is seen in the delivery of warm milk. This is not so much the fault of the producer as of the consumer, but, wherever the fault lies, the health department should correct it. In Richmond all the milk handled by the city depots is practically ice cold, and this should have led to the practice of cooling all milk.

The ordinance providing for a dairy inspection requires that a permit be taken out by retailers, such permit to be valid for such period only as the premises are maintained in fit sanitary condition. The ordinance requires 3 per cent of fat in the milk, and milk cans containing skimmilk are to be plainly labeled. Three inspectors are kept employed. The analyses made of the milk by the inspectors before and after the ordinance went into effect show that regulation was badly needed, as the milk had evidently been of very poor quality.

The dairy business in this city has gone through a gradual development. The city milk depots are not old concerns. Prior to their establishment the milk was sold direct from the dairy farms; in fact, it has not been many years since nearly every family in the city that was able to do so kept its own cow. The cream trade in the city is comparatively new, five years ago there being no cream whatever sold.

As has been pointed out, no warm milk should be allowed to be delivered in the city. Producers should be required to use milk coolers. It might be well for all the milk to be bottled, at least when customers demand it. At the present time very little, if any, bottled milk is sold, the can with a faucet at the bottom being used in nearly all cases. Dairy cows should not be allowed to be kept in the city. The groceries should not be allowed to handle milk. Richmond is the only Southern city that has this sort of milk trade, and it is so great a source of evil that it should not be tolerated.

Norfolk and Portsmouth, Va.

Population: Norfolk, 46,624; Portsmouth, 17,427. Amount of milk sold daily, exclusive of that produced by family cows, 2,000 gallons. Number of family cows, not estimated.

The following are the prices for dairy products: Milk retailed to consumers, 8 to 10 cents per quart; milk in gallon lots to hotels, restaurants, etc., 20 to 25 cents per gallon; price paid for milk to producers by dealers,[b] 20 cents per gallon; ice cream of doubtful quality, from $1 to $4 per gallon; buttermilk retails

[a] Some cream is shipped from Washington, and some from Baltimore.

[b] Only a very little milk is thus handled, as the greater part is sold directly from the producing dairies.

to consumers at 5 cents per quart. There is no trade in cream except for a small quantity that is shipped in for ice cream making.

Norfolk is the only city in the South where the dairymen have a valid excuse for not feeding and keeping cows as they are kept in the better dairy districts. This city is situated in one of the great trucking sections of the United States, and the land that could otherwise be devoted to raising feed for dairy cows is held at $500 to $1,000 an acre. This is too valuable land to be used for raising feed for dairy cows. The only alternatives are to ship milk from a distance, which, with the present state of dairy knowledge in the South, would be impracticable, or to confine the herds on comparatively small areas and feed almost wholly on imported foods. The latter course has been adopted, though in a few instances a small area of the valuable trucking land is utilized for growing silage corn, which furnishes a portion of the feed.

The milk when it reaches the consumer is almost fresh, as the milking is done at an early enough hour in the morning to allow the fresh milk to be delivered in time for breakfast. A number of the better dairymen cool the milk before delivering, though much of the milk is delivered warm. About half of the retail milk is bottled, and the health office is very strict in enforcing the regulation against refilling bottles on the route. Before the ordinance in regard to dairy inspection and the use of preservatives went into effect Norfolk received much of its milk from Baltimore, but at the present time the milk is all produced within 5 miles of the city. An indefinite number of cows were kept for private use in the city limits. But the entire milk product is much below the actual requirements of the city and the shortage is made up by a heavy sale of condensed milk.

The milk sold in Norfolk is of very good quality, comparatively, owing to two causes—one being the fact of a comprehensive inspection ordinance well administered, and the other the influence of a couple of very fine dairies that have set a rather high standard, which must be met partially by all other dairymen doing a competitive business. These two dairies are the equal in all respects to many of the so-called sanitary dairies of the North.

The ordinance providing for the inspection of milk and dairies of Norfolk requires the milk to contain 3 per cent of fat and that certain conditions be observed in regard to cleanliness around the stables and milk houses, the inspector having the power to revoke licenses where these conditions are not complied with. The ordinance further provides that all cows furnishing milk in the city are to be tuberculin tested. Under this order over 1,100 cows have been tested. There is a chance for question as to the thoroughness of this test, since less than 30 of the 1,100 cows responded to the test. Portsmouth differs from Norfolk in having no inspection law, but as in many instances the same dairies supply milk to the two cities it is thought advisable to consider the two together.

Newport News, Va.

No regular study was made of the milk situation in Newport News, but inquiries were made, and, as this city lies across the James River from Norfolk and Portsmouth, it is interesting to make some comparisons. The milk retailed in Newport News does not have an enviable reputation for quality. This is due to two causes. The city has no milk inspection, and the dairymen do about as they see fit. And, again, no dairyman has as yet undertaken to supply the city with good milk, as has been the case in Norfolk. The people have made an effort to secure such a dairy, which would show that the present condition is not wholly the consumers' fault. Prices and other conditions are about the same as in Norfolk. It is obvious that the city needs an ordinance regulating the production and sale of milk, as no city is likely to secure good milk without such an ordinance.

Lynchburg, Va.

Population, 18,891. Amount of milk sold daily in city, exclusive of that produced by family cows, 400 gallons. Number of family cows kept in city estimated at 200.

The following are the prices for dairy products: Milk, retail to consumers, 6 to 8 cents per quart; milk in gallon lots to hotels, restaurants, etc., 16⅔ to 25 cents per gallon; ice cream of very poor quality, $1 per gallon. There is no cream trade in the city.

The amount of milk given as consumed daily was approximated by getting the number of cows that supply the city with milk and estimating the yield per cow. About 250 cows are kept in dairies for the city trade. Of these, 150 produce the milk for the strictly retail trade and the others supply hotels and restaurants. Some milk was, of course, sold to neighboring families from most of the family cows. A liberal estimate for the milk actually consumed for domestic purposes would be about 600 gallons per day. This is an exceedingly small amount per capita compared with Northern cities. Why such a small amount of milk should be consumed is difficult to determine when we consider the fact that the country around Lynchburg is much better adapted to dairy farming than to any other agricultural pursuit, being very rough and difficult of cultivation. This small consumption may be due either to the fact that no more milk can be obtained or to the small demand. In some of the Southern cities the demand exceeds the supply, while, on the other hand, some that consume the least per capita seem to have all the milk that can be used.

In regard to the prices of the various dairy products quoted, it might be said that all the dairymen state that they are receiving 8 cents per quart for all retail milk sold, but there is evidence of considerable cutting from this price. The ice cream sold is evidently not of extra quality, being in all probability made from condensed milk or so-called evaporated cream. Nearly all of the milk sold in Lynchburg is bottled immediately as it comes from the cow and is delivered warm. The milking is done shortly after midnight and early in the afternoon, and two deliveries are made each day.

Lynchburg has no milk inspection, and there is considerable complaint of watered and skimmed milk. Most of the dairies supplying the retail trade are within the city limits, having very small yards for the cattle to run in. The stables are poor affairs, little or no bedding is used, and no effort is made to keep the cows clean. In a wet season and in winter the conditions must be miserable in the extreme. It is just possible that these conditions account partially for the small amount of milk consumed. This city needs to have its milk supply regulated by the health department. This would be the first step in securing good milk. At one time a company shipped milk to Lynchburg from Orange County, Va., but it did not give satisfaction and the company soon failed.

Danville, Va.

Population, 16,520. Amount of milk sold in city daily, exclusive of that produced by family cows, 350 gallons. Number of family cows kept in city not estimated.

The following are the prices for dairy products sold in the city: Milk, retail to consumers, 5 cents a pint, 8½ cents per quart; milk in gallon lots to hotels, restaurants, etc., 20 cents per gallon in summer, 24 cents per gallon in winter; cream containing 20 per cent fat, 40 cents per quart retail; buttermilk, retail to consumers, 10 to 20 cents per gallon.

No milk is shipped into Danville, but some pasteurized cream is shipped from Blacksburg. The dairies that supply the city with milk are all outside of the

city limits, and most of the dairymen attempt to raise a large part of the rough feed given the cows. As the cows have plenty of yard room, and most of them are pastured in the growing season, they are in good condition as regards cleanliness during most of the year. A few of the stables and dairy houses were visited by the writer and appeared to be kept clean. One dairy especially was kept very clean, and it was very evident that it furnished good milk.

The city has recently established milk inspection, and one man devotes the greater part of his time to this work. The milk is required to show 3 per cent fat. Owing to the fact that there are but about fifteen dairies supplying milk to the city, and perhaps as many wagons delivering milk in the city, the one inspector finds it easy to make frequent collections of samples and in this way keep the milk to a very high standard. The city requires that not more than two cows be kept in any one place in the city and this prevents the city dairy. All cows in herds supplying milk to the city are required to be tuberculin tested; but as no animals have responded there may be some question as to the thoroughness of this test. The ordinance states that dairy barns are to be regularly inspected, but as yet no funds have been provided to enforce this part of the work. The cows, as a rule, seem to be very well fed; and the opinion was expressed that in an attempt to improve the quality of the milk many of the dairymen were feeding more grain than they had previous to the inauguration of the inspection service. About half the milk retailed in the city is bottled. A few of the dairymen run the milk over a cooler and aerator before bottling. The rest of the milk is delivered warm, the milking being done in time to allow of the milk reaching the consumer before meals, morning and evening.

There is a great and insistent demand for good milk in Danville, owing to the fact, perhaps, that a few of the citizens have preached the doctrine of pure milk until the consuming public has become educated. In this city the people seem anxious for the establishment of a sanitary dairy and are willing to pledge themselves to its support. There is always a shortage of milk except, perhaps, in June. In the fall and winter there is never enough milk to supply the demands of the people.

Wilmington, N. C.

Population, 20,976. Amount of milk sold in city daily, exclusive of that produced by family cows, 200 gallons. A large number of family cows kept, estimated at more than 400.

The following are the prices for dairy products sold in the city: Milk, retail to consumers, 10 cents per quart; milk in gallon lots to hotels, restaurants, etc., 25 cents per gallon; cream containing 35 per cent fat, 60 cents per quart retail; ice cream of doubtful quality, $1.50 per gallon; buttermilk, retail to consumers, 20 cents per gallon.

The supply of milk in relation to the demand can be judged from the statement of a hotel proprietor that no difficulty is ever experienced in getting plenty of milk. On the other hand, a large condensed milk trade is reported, many saying that they prefer it to the fresh milk for most domestic purposes. The cream trade is very small. The consumers demand that the buttermilk contain a small number of butter granules as an indication of good faith. This demand is met by churning a little cream at a low temperature so that the butter would come in finely granular form, and adding this to the sour milk.

The retail trade in milk in Wilmington is said to be a growth of the last ten years; prior to that time the city was entirely supplied with milk from family cows. The dairy business is said to be increasing rapidly, and the number of family cows decreasing correspondingly. This city is in a great trucking section

and the land near the city is therefore very valuable. As a result, cows are fed largely on imported feeds, mostly on cotton-seed hulls and cotton-seed meal. There is no city inspection, and because of this fact there is possibly a large proportion of water and skimmilk sold. On the other hand, one of the best dairies in the South supplies milk to the Wilmington market. This dairy keeps about 100 cows. The owner had unusually good knowledge in regard to feeding and how to care for milk, and all the practices common to the so-called sanitary dairy barns were in force in his barns. The cows were kept very clean, the udders were washed, milkers wore clean suits, and the milk was cooled and bottled in a model dairy room.

All of the milk sold in the city is bottled, but much of it is bottled warm. Cows are milked in the morning in time to permit the milk to be delivered for breakfast.

Wilmington is badly in need of a dairy and milk inspection.

Raleigh, N. C.

Population, 13,643. Amount of milk sold in city daily, exclusive of that produced by family cows, 150 gallons. Family cows kept in the city number about 300.

The following are the prices for dairy products sold in the city: Milk, retail to consumers, 7 to 8 cents per quart; milk in gallon lots to hotels, restaurants, etc., 20 to 25 cents per gallon; cream containing 20 per cent of fat, 25 cents per quart retail; 30 per cent fat, 40 cents per quart retail; ice cream of doubtful quality, $1 to $2 per gallon; buttermilk, 10 cents per gallon retail.

Though it is evident that very little milk is consumed in the city, it is stated that very little condensed milk is sold. The people, never having been accustomed to the use of milk, do not feel its need. Very little cream is sold, but, on the other hand, there was a good demand for ice cream, though it is doubtful if any ice cream of the best quality is to be had at any price. A peculiarity of the dairy trade is the very low price at which 20 per cent cream sells compared with the retail price for milk, and this, too, when the supply of cream compared with the demand is said to be very short. The demand for buttermilk is also much greater than the supply, though buttermilk sells at a much lower figure than in most cities of the South.

One dairyman in Raleigh has bought all the dairies. The cows, such as he wanted to keep, were moved to a farm 2 miles from the city. The milk was to be cooled and bottled on the farm. The danger where one dairy supplies all the milk for a city the size of Raleigh, and where there are no city regulations to control the quality of the supply, lies in the fact that lack of competition is very likely to lead to poor methods. Raleigh has a great amount of land lying near the city which can be bought at a reasonable price and which could support dairy cows to great advantage. There should be more dairies, and the city should have some control over the quality of the milk delivered.

Greensboro, N. C.

Population, 10,035. Amount of milk sold in city daily, exclusive of that produced by family cows, 200 gallons. Family cows kept in city, estimated at 325.

The following are the prices for dairy products sold in the city: Milk, retail to consumers, 6 to 8 cents per quart; milk in gallon lots to hotels, restaurants, etc., 17 to 20 cents per gallon; cream of poor quality, 25 cents per quart retail; ice cream of poor quality, $1 per gallon; buttermilk, 10 cents per gallon retail.

Most of the milk retailed in Greensboro is bottled, and it is reported that nearly all of the dairymen have milk coolers. But there seems to be no demand for good milk. The city maintains no milk or dairy inspection, and the health office takes no interest in this work, but the dairy barns seem to be kept in very fair condition. All of the herds supplying milk to the city are outside of the city limits, and are kept on farms where a large part of the rough feed is raised and pasture is provided. There seems to be a demand for more milk than can be procured for the retail trade of the city; but, notwithstanding this fact, one or two dairymen have discontinued a retail business on account of some discouragements, and are getting much less for their milk than could be secured at retail.

Charleston, S. C.

Population, 55,807. Amount of milk sold in city daily, exclusive of that produced by city-kept cows, 300 gallons. Cows kept in the city number about 750, but not all of these are, strictly speaking, family cows.

The following are the prices for dairy products sold in the city: Milk, retail to consumers, 8 to 10 cents per quart; milk in gallon lots to hotels, restaurants, etc., 24 cents per gallon; price of milk paid to producers by retailers, 16 cents per gallon; cream containing 18 per cent of fat, 25 cents per quart retail; ice cream of questionable quality, $1 to $2 per gallon; buttermilk, 5 cents per quart retail.

Charleston has two dairies which buy the milk from farms near the city and do a retail business. One of these handles the milk from about 150 cows, most of which are kept on one farm, which is under the supervision of the manager of the city dairy. Two wagons are required for the delivery service. The other dairy handles the milk from 160 cows kept on a number of small farms, and a push-cart business is done exclusively. Both of these dairies bottle a part of the milk, and it is claimed that practically all of the milk is cooled, or at least run over a cooler, when it is milked. It appears that the milk is fairly well cared for in most instances, and consumers unite in the opinion that no skimming or watering is resorted to.

A peculiar condition arises from the fact that Charleston has naturally two sources of milk supply. As has been stated, the milk retailed by the two large dairies is as good as that sold to the greater part of the trade in any Northern city, while the milk sold from the city cows is of very doubtful quality. The retail prices given for milk in the city were 8 and 10 cents per quart. The 8 cents per quart was realized by the dairies furnishing the good milk, while the 10 cents was paid for the milk from the city cows. This is due to two distinct causes. One is the lack of knowledge on the part of the consumers; the other is the fact that most of the city-kept herds are owned by formerly well-to-do residents who have adopted this means of making a living. Thus sentiment operates largely in making the discrimination in prices. What Charleston needs mostly is the education of the consumers to the point where they can realize the advantages of good milk and the menace to the health that is in poor milk and the city dairy herds.

Charleston receives an unusually large proportion of its milk supply from cows kept within the city limits. The health officer claims there are from 500 to 600 such cows, but the manager of one of the dairies before referred to made a count of the cows in the city, and said that there were 850. There are reasons to believe that the manager's count was more nearly accurate than the report of the health office. These cows are kept in numbers running all the way from 1 to 15. They are found in all parts of the city, the best residence portion not being exempt. The health officer has waged vigorous war against these herds with a view to having them forced out. Up to date he has merely succeeded in

obtaining an ordinance requiring the stables to have board floors and a certain degree of cleanliness as regards the disposal of the manure. In this last matter, however, the health office is having difficulty in securing the enforcement of its demands. The quality of the milk arising from these conditions can not be good, and the menace to the health of the city caused by dairy herds being kept in the center of densely populated districts can not be overdrawn. The health office is certainly justified in its efforts to banish the dairy cow from the city. The health officer reports that so far as he can determine, there has been no decrease in the number of cows kept in the city during the last few years. The people seem to cling to the old system. On the other hand, the dairymen give figures that tend to show that the amount of milk sold from the herds outside of the city is constantly increasing. This no doubt is taking the place of the condensed milk formerly used in the city, a large trade in this commodity being reported. The growth of the dairy industry as related to the production of milk on dairy farms has been a growth of comparatively few years.

Columbia, S. C.

Population, 21,108. Amount of milk sold in city daily, exclusive of that produced by family cows, 250 gallons. No estimate of number of family cows could be secured.

The following are the prices for dairy products sold in the city: Milk, retailed to consumers, 7, 8, and 10 cents per quart; milk in gallon lots to hotels, restaurants, etc., 24 cents per gallon; cream containing 30 per cent fat, 50 cents per quart retail; ice cream made from condensed milk, 40 cents per quart; buttermilk, 10 cents per gallon retail.

About 250 cows, kept in dairies outside of the city, supply the milk sold. One of these dairies has 150 cows and does a good business, everything being kept very clean, and the milk is cooled before bottling. The other dairies each keep a small number of cows, and not much attention is paid to producing good milk; the milk from these dairies is bottled warm. Two deliveries per day are made, the cows being milked soon after midnight and again soon after noon.

It is impossible to make any estimate of the number of family cows kept in the city, as men who should be acquainted with the condition varied in their counts so much as to make their estimates entirely worthless. It is very likely, however, that the usual number of cows common to the cities of the South will be found in Columbia, though there are no herds kept inside of the limits.

There is a demand for more milk than the dairies can supply. Very little cream is sold, and the ice cream was reported to be made mostly from condensed and evaporated milk products, though a very high price is charged. There is no milk inspection.

Spartanburg, S. C.

Population, 11,395. Spartanburg in its dairying is characteristic of many Southern towns of about the same size in that practically all of the milk used in the city comes from family cows. There is but one dairy doing a retail business, and, so far as can be determined, it was leading a very precarious existence. Up to the present summer there were two dairies, one of 12 and the other of 25 cows, but the smaller of the two discontinued business. The larger dairy herd is made up of Jerseys, and the owner supplies pretty good milk. He sells to hotels at 20 cents a gallon, and in quart quantities at 6 cents. Cream for ice

cream is shipped from Biltmore, N. C., and ice cream sells at $1.50 to $2.50 per gallon. A small condensed milk trade is reported. No estimate of the number of family cows can be made, but it is evidently not large.

Atlanta, Ga.

Population, 82,872. Amount of milk sold in the city daily, exclusive of that produced by family cows, 5,000 gallons. No estimate of number of family cows can be secured.

The following are the prices of dairy products sold in the city: Milk, retailed to consumers, 7 to 10 cents per quart; milk in gallon lots to hotels, restaurants, etc., 20 cents per gallon; price paid for milk to producers by dealers, 15 to 20 cents per gallon; cream, containing 25 per cent fat, 40 cents per quart retail, $1 per gallon wholesale; ice cream, $1.20 to $3.20 per gallon; buttermilk, 12½ cents a gallon.

Atlanta is supplied with milk from 10 dairies that buy milk from dairy farms and do a retail business, and by about 300 small dairy herds located inside of and near the city limits. In addition to this there is one concern that does strictly a wholesale business, selling to smaller dealers and to hotels. This is run in connection with a dairy farm located near the city, which keeps 200 cows, and in addition to this a considerable amount of milk is bought from dairy farms. The dairies which do a retail business drive from one to three wagons only. Some of the milk which supplies these dairies comes from four farms as far away as 35 miles; but most of it is produced on farms within 10 to 15 miles of the city. Some of the milk from the nearer farms is hauled in by wagons which make the trip twice a day, and some by railway trains, but most of it is carried by an electric road which runs about 15 miles from the city, shipments being made twice a day on both the steam railroad and the electric road.

The unusually large number of dairies inside of the city limits licensed to do a retail business are, as a rule, quite small, running from 2 to 10 cows each. In addition to these small herds is an undeterminable number of cows kept for family use. No estimate as to the actual number of such cows could be made by the health office that had general supervision of the dairy work, but it was said to be large, and very likely ran up well into the hundreds.

Atlanta has a pretty extensive milk inspection that reaches to all farms producing milk for the city. One inspector looks after the quality of the milk sold and one visits the stables and looks after the general sanitary conditions affecting the herds. The city requires that the milk shall contain 3 per cent of fat, and all the dairymen doing a retail business are emphatic in testifying that this regulation is rigidly enforced. The inspector having charge of the city work seems to be particularly active, and samples are taken from the milk of all dairies very often. The health office seemed to be very strict with the milk from herds inside of the city limits, and it is reported that the number of such herds is constantly decreasing owing to the activity of the inspectors. The city regulations require that a certain degree of cleanliness shall be observed in the barns and that all cows furnishing milk for the city trade receive good water. The country inspector reports that practically all milk sent to the city is run over a cooler as it is milked. The greater part of the milk sold in the city is bottled. No preservatives are used, and the milk from the country dairies is about twelve hours old when it reaches the consumers.

A few years ago a large dairy company was organized in Atlanta to handle the retail business of the city. This company for a time handled 2,500 gallons of milk daily and drove about twenty wagons. After being in business for a short time it failed, but was taken up by new men and did business for a few months,

finally failing again, and being entirely abandoned in 1903. The milk dealers of the city think that the failure was due to the inexperience of the men having the business in charge, as the company controlled the business of the city for a short time.

In 1903 the press of Atlanta undertook a crusade against poor milk, and public sentiment was worked up to an unusual degree. This sentiment seemed to have taken a turn toward having all of the milk sold in the city pasteurized. It is very unfortunate for the welfare of the city that this could not have been turned into other channels, such, for instance, as the prohibition of city dairies and city-kept family cows, which are a serious menace to the health of the city, and to a demand that all milk sold in the city be cooled to a reasonable temperature as soon as it was milked.

Savannah, Ga.

Population, 54,244. It is impossible to get any estimate as to the amount of milk sold daily or the number of family cows kept in the city.

The following are the prices for dairy products: Milk, retail to consumer, 7 to 8⅓ cents per quart; milk in gallon lots to hotels, restaurants, and ice cream makers, 25 cents a gallon.

Accurate information concerning many features of the milk supply of Savannah is most difficult to obtain. No one man seems to know in a general way what is being done in the dairy business outside of his own particular trade. There is no milk or dairy inspection, and the health office has not investigated the milk situation. Some of the doctors of the town have agitated the sanitary side of the question, but the movement is new and the information to be obtained is rather general.

As was stated, Savannah has no milk inspection, and there appears to be plenty of evidence that advantage was taken of this fact to skim, water, and use preservatives in the milk. A large part of the milk for the retail trade is bottled. Most of the dairymen own and claim to use milk coolers, but very little investigation was required to show that the use of coolers is not well understood. In fact, aside from the questionable benefit to be derived from aeration, it is likely, considering the poor care that is taken of the cooler and the dirty surroundings, that the milk would be much better if bottled warm. Two deliveries per day are made, and the milking is done at midnight and noon, allowing the fresh milk to be delivered.

The herds that supply Savannah with milk are mostly kept near the outskirts of the city and within the city limits. A few of the small herds are within thickly populated residence districts, and the family cows are found in numbers in all portions of the city. No pasture is available for any of the city dairies, and, as there is no milk inspection, the barns and yards are kept in poor, even miserable, condition in many cases. Even the dairies which were not in the city limits have so little land that no attempt is made to pasture the cows, cotton-seed hulls and meal being almost the entire dependence for feeds. The land is sandy and feed is not easily grown, and, moreover, the herds are all so near the city that the land which they occupy is too valuable to be used extensively for raising feed and pasturing cows.

There is very little cream trade in Savannah, and the cream used for making ice cream is shipped on ice from Spencerville. The city has plenty of milk, such as it is, and a large surplus is reported for the spring, when most of the cows are fresh, and in summer, when a large part of the milk-consuming population is gone because of the hot weather.

Savannah needs a milk-inspection system very badly. The size of the city,

the climate, and the conditions of the situation of the city make this imperative almost for the welfare of the city. So little dependence can be put on the milk that very few of the infants are fed on this ordinarily best substitute for natural food, condensed milk being preferred by physicians. When the city has a milk inspection it will be time to discuss other improvements which ought to be made. These possible improvements embrace the entire detail of handling milk for a sanitary supply, for at the present time there is nothing to commend in the milk situation as it is found in Savannah.

Augusta, Ga.

Population, 39,441. Milk sold daily, not including that produced by family cows, 600 gallons. Family cows kept in the city, about 500.

The following are the prices for dairy products: Milk, retail to consumers, 6 to 10 cents per quart; cream containing 25 per cent of fat retails at 40 cents per quart, and sells in gallon lots at $1.20 per gallon; milk in gallon lots to hotels and restaurants, 20 to 30 cents per gallon; ice cream, $1.50 per gallon; buttermilk, 12 to 15 cents per gallon.

At the time the writer visited the city Augusta had just passed an ordinance for milk and dairy inspection, requiring that the milk contain 3 per cent of butter fat and that certain conditions in reference to the cleanliness of the stables be observed. This had not become operative as yet, and it was impossible to tell what effect it would have on the milk supply. Considering the fact that the city had never had any form of dairy inspection, it was getting exceedingly good milk. Practically all of the dairies furnishing milk for the trade were visited, and, considering that few of the cows were furnished pastures, they were admirably kept, the stables in which the milking was done being clean and the cows in excellent condition. This unusual condition can be accounted for by the fact that there is a very healthy and keen rivalry among the dairymen, each striving to furnish the cleanest and richest milk, a strong element in the situation being the presence of a very fine Jersey herd owned and managed by a man having a good knowledge of sanitary milk.

The greater part of the milk sold in the city is bottled So far as can be determined, the delivery of this bottled milk when warm is the only serious fault of the milk supply of the city. Two deliveries per day are made, the milking being done at early hours in the morning and afternoon. The herds, with one or two exceptions, are kept on the outskirts of the city, but they are in no instance cramped for yard room for exercise, and they are so far away from the residences as not to be a menace to the health of the city. Practically all of the rough feed is produced on the dairy farms, and green feed is fed largely in summer.

There is a good demand in Augusta for milk, and the dairymen all agree that much more milk could be sold than is now produced. This is particularly true in the winter, when several large winter-resort hotels are open for about four months, and this is a period of the year when the least milk is available. A considerable condensed milk trade is reported.

Macon, Ga.

Population, 23,272. Amount of milk sold daily, not including that produced by family cows, 800 gallons. Number of family cows kept is large, but no estimate secured.

The following are the prices for dairy products: Milk, retail to consumers, 6 to 8 cents per quart; milk in gallon lots to hotels and restaurants, 20 to 25

cents per gallon; cream containing 25 per cent of fat, 40 cents per quart retail; buttermilk, 10 to 15 cents per gallon; ice cream, $1.25 to $2 per gallon.

The city limits of Macon are very restricted and have not been extended for many years. It is claimed that a population of about 50,000 live within a radius of 3 miles of the center of the city, and it is very likely that this is near the real population of the city.

Macon has no milk inspection, but milk is furnished from one large herd of Jerseys that comes near in quality to the so-called sanitary milk of Northern cities. Most of the milk sold in the city is first cooled, though it is likely that the cooling in many instances is not well done. Part of the milk is bottled. In summer the milking is done at early hours and the milk delivered twice a day, even though it has been cooled. Macon needs milk inspection.

Jacksonville, Fla.

Population, 28,429. Milk sold in the city, about 500 gallons daily.

The following are the prices for dairy products: Milk, retail to consumers, 8 to 10 cents per quart; in gallon lots to hotels, 25 to 30 cents; ice cream, $1.50 per gallon.

The source of the milk supply of Jacksonville is different in some respects from that of any other city of the size in the United States. Jacksonville is south of the region where Jersey blood predominates in dairy cattle. One of the dairymen that supply the city has a number of Jersey cows, but nearly all of the other herds are of the small-bodied type of cattle common to the Southern pine lands. This type of cattle is a very light milker, and it is claimed in Jacksonville that the milk is not of very good quality. These cattle are allowed to roam through the woods near the city, and, owing to the climate, they secure green pasture throughout the entire year and are never stabled. There are great areas of unfenced timbered land near enough to the city to afford pasture for all of the cows kept for the city milk trade.

Jacksonville has an ordinance requiring milk to have 3.5 per cent of fat, but the health officer says that it is impossible to enforce this provision of the law because, as he claims, the climate makes it impossible to produce milk with this percentage of fat. The writer has seen nothing in the South that would lead to the belief that the climate affects the fat content of the milk. In fact, all evidence gained from a number of sources goes to show that milk richer in butter fat is produced in the South, as a rule, than in the North. The peculiar type of cow found around Jacksonville and common to all the Southern pine lands may or may not produce milk of average composition. No evidence on this question is obtainable.

Part of the milk sold in the city is bottled and part of it is cooled, but most of the milk is delivered warm twice a day from cans. There is no cream trade, and the cream used for ice cream was said to be shipped from Tennessee. No family cows are kept in the city, owing to the cheapness of pasture so near the city.

Jacksonville needs more rigorous inspection, and the dairymen should be compelled to use coolers. The city has a climate which makes a good milk supply very difficult to obtain, but milk as it is now sold could be greatly improved.

WINTER HOTEL MILK SUPPLY.

In connection with the discussion of Jacksonville's milk supply, it may be of interest to note a report from Jacksonville that the well-known winter-resort hotels located at intervals from St. Augustine for a considerable distance along the Atlantic coast have a peculiar method of securing good milk. This climate

would, of course, be very hard on cows in the summer, and, moreover, there would be no occasion for cows being kept there in summer, as the places are practically depopulated. To meet these conditions, the owner of the hotels owns herds of cows that are shipped into the southern part of Georgia and Alabama for the summer, and a short time before the resorts open are shipped back to the hotels.

Pensacola, Fla.

Population, 17,747. Milk sold daily in the city, 400 gallons.

The following are the prices for dairy products: Milk, retail to consumers, 10 cents per quart; in gallon lots to hotels, 35 cents per gallon; cream with 25 per cent fat, 40 to 50 cents per quart; ice cream, $2 and up per gallon; buttermilk, 25 cents per gallon. A very heavy trade in condensed milk is reported.

Pensacola is the only city visited where the people are emphatic in stating that not enough milk is to be had to supply their needs. As noted above, prices for dairy products were very high, but poor stock, unfavorable climate, inability to grow paying quantities of feed, etc., all combine to keep the supply much below the demand. It was reported that a Government hospital located near Pensacola was desirous of getting 200 quarts of milk per day, but found it impossible to secure the quantity required. There was very little cream trade in the city, and cream for ice cream was shipped from Tennessee and North Carolina at very high prices.

Pensacola has no milk inspection, and the milk sold is very poor both in composition and from a sanitary standpoint. It is quite evident that much of the milk sold is watered or skimmed. Most of the milk is delivered warm and much of it is not even strained. The demand, coupled with the fact that there is no inspection, makes it possible to dispose of a very poor article of milk.

Not many family cows are kept in the city, though a few of the herds supplying milk to the city were kept inside the corporation limits. An effort is being made to get these herds removed. Very few of the herds had any space for exercise. Practically all of the cattle are fed on imported feeds, owing partially to the poor soil.

The only recommendation that can be offered for the improvement of the supply is that an inspection ordinance be passed, and that it be directed toward securing sanitary milk as well as that having a certain standard of butter fat.

Montgomery, Ala.

Population, 30,346. Milk sold in the city daily, not including product of family cows, 600 gallons; cream, 30 gallons. Family cows kept in the city, between 300 and 400.

The following are the prices for dairy products in the city: Milk, retail to consumers, 6¼ cents per quart; in gallon lots to hotels and restaurants, 15 to 20 cents per gallon; cream containing 25 per cent of fat retails at 40 cents per quart; ice cream sells at $1.25 to $1.50 per gallon; buttermilk, 10 to 15 cents per gallon.

Montgomery has a very thorough milk inspection and stringent laws governing the sale of dairy products. The milk is required to show 3.5 per cent of fat; and, as samples of milk are taken from every dairy about every week, the dairymen are forced to live up to the requirements of the law very strictly. The writer saw a lot of the samples from different dairies tested, and it was a matter of some surprise to note the relatively high percentage of fat.

The dairy inspection includes the herds, stables, and yards. All cows milked for the city supply are required to be tuberculin tested, and must be furnished

well water or water from a good running stream. Stables are required to be whitewashed and cobwebs swept down; and a number of stables that could not be kept in good condition were condemned. Practically all of the herds supplying milk for the retail trade are kept outside of the city limits with plenty of room. Some have pasture and many receive green feeds in the summer. The number of cows kept in the city is said to be decreasing.

Most of the milk sold in the city is bottled, and part of it is cooled at the time of milking, the rest being delivered warm. Two deliveries per day are made, and the milk is but a few hours old when it reaches the consumer. The city seems to be getting all of the milk required for the demand; some cream was shipped to Pensacola.

Montgomery has a very good milk supply—as good or better than will be found in the greater number of cities of the same size in the North. This is largely due to the activity of the inspector and to the support the law officers give him. The only faults that can be found are with the keeping of family cows in the city and the delivery of warm milk.

Birmingham, Ala.

Population, 38,415. Milk sold in the city daily, not including product of family cows, 800 gallons; cream sold, 50 gallons. Family cows kept in the city, estimated at 500.

The following are the prices paid for milk products in Birmingham: Milk, retail, to consumers, 6 to 10 cents per quart; to hotels, 20 to 25 cents per gallon; paid to producers for milk by dealers, 20 cents per gallon; cream containing 25 per cent of fat sells to consumers at 40 cents per quart; ice cream made from cream containing 20 per cent of fat sells at $1.50 per gallon; buttermilk sells at 10 cents per gallon. A very large condensed milk trade is reported.

Birmingham has a well-enforced milk and dairy inspection. Milk is required to contain 3 per cent of fat, and the stables and yards where cows are kept are regularly inspected and required to be kept in good condition. All cows furnishing milk to the city are tuberculin-tested. The health officer reports that out of a total of nearly 1,700 cows so tested but 7 responded and were condemned. This appears to be a very low average. As was noted, 500 cows are reputed to be in the city limits, and of this number 60 cows are kept in three dairies, which are the only dairies conducted inside of the city. It was said that a very few years ago fully 2,000 cows were kept in the city, but the number is constantly decreasing, and the dairies which were formerly located in the city have moved out into the country.

Birmingham is in an ideal country for dairying. It is much better adapted to dairying than to any other agricultural pursuit. The land is rough, timbered, and grasses grow well. Good water is abundant. The dairymen seem to be a little more advanced than in most cities, and the city has a well-conducted modern city milk depot, doing a good business. This depot is built according to modern ideas and has every appliance, including a pasteurizing outfit, for handling its milk supply. This dairy has branches in suburbs of the city and, so far as could be determined, it is well patronized. It buys most of its milk from farmers who live as far away as 25 miles. A very strict contract was made with the producers, in which they agree to observe certain conditions in regard to caring for the herd and stables, and in handling the milk. Some cream is shipped from Tennessee. All of the milk sold in Birmingham is said to be cooled as it is milked, and no warm milk is delivered, as is done in practically every other city visited. Most of the milk sold in the city is bottled, but a part is sold from cans.

Mobile, Ala.

Population, 38,469. Amount of milk sold in the city daily, not including product of family cows, 400 gallons. No estimate of number of family cows could be secured, but a large number of families have cows for individual needs.

The following are the prices for dairy products in Mobile: Milk, retail, to consumers, 8 and 10 cents per quart; to hotels and restaurants, 25 to 35 cents per gallon; paid to producers by city dealers, 20 to 22½ cents a gallon; cream sells at 40 to 50 cents per quart; ice cream sells at $1.50 to $2 per gallon; buttermilk retails at 25 cents a gallon, and in large lots sells for 20 cents a gallon.

Mobile has no milk and dairy inspection and it is claimed that much of the milk sold in the city is of poor quality, being either skimmed or watered. One milk depot is doing business in the city, the greater part of the milk coming from one farm near the city and some coming by rail as far as 15 miles. Some cream is shipped in from Tennessee. The dairy farm furnishing the greater part of the milk for this depot was conducted along modern lines in every way. It is kept very clean, and the cows are in good condition and have plenty of yard room. Other herds supplying the city are not so well kept. A number of dairy herds are located inside of the city and a few are in the most thickly populated portion.

Most of the milk for the retail trade is bottled and the majority of the dairymen run the milk over coolers as it is milked. Two deliveries per day are made and fresh milk is delivered, requiring very early milking morning and afternoon.

Mobile, like the other seacoast cities, is located in a climate and on a soil that appears to make dairying a difficult occupation. The cows give a light yield of milk, and feed in paying quantities is difficult to produce. On the other hand, it will be noted that prices are inviting. A heavy condensed milk trade is reported; and it was very evident that not enough milk, cream, and buttermilk is obtainable to supply the demand.

Vicksburg, Miss.

Population, 14,834. Milk sold in the city daily, not including the product of family cows, 350 gallons. No estimate of number of family cows kept can be secured.

The following prices are paid for dairy products in Vicksburg: Milk, retail, to consumers, 8 to 10 cents per quart; in gallon lots to hotels, 6 to 8 cents per quart; cream, 90 cents to $1.20 per gallon. A small condensed-milk trade is reported.

Vicksburg is not one of the cities reporting a large trade in ice cream, and very little buttermilk is sold. The small trade in buttermilk is in striking contrast with the cities visited in the Carolinas and other States south of Virginia. No explanation can be offered, as the climate is the same as in many of the cities mentioned heretofore.

Vicksburg undoubtedly receives milk of very poor quality. Milk is watered and no secret is made of the fact. It seems to be expected by the consumers, and one of the largest producers and retailers in the city, in the presence of his principal customer, told the writer that he added a certain proportion of water to all of his milk, and that every other dairyman doing business in the city did the same thing. A certain standard of adulteration is supposed to be observed. It is stated that all dairymen are supposed to add 1 gallon of water to every 4 gallons of milk. No skimming is supposed to be done, but where a little water is added with the consent of the consumer, there is a strong probability that much more water would be added on occasion. In fact, nothing was seen or

heard that would lead one to believe that the water added to the milk stopped at 1 gallon to 4. It appeared very probable also that skimming is practiced as well as watering.

But watering and skimming milk are not the only faults of the milk supply. All herds supplying the city, with one or two exceptions, are kept inside of the city limits, with inadequate and filthy yard room and exceedingly poor stables. The condition of these herds and stables in wet times can only be imagined, but it must be very bad. None of the milk sold in the city is cooled.

What Vicksburg needs, as a start toward securing better milk, is a few public-spirited citizens with sufficient knowledge of the milk business to start a campaign of education along this line that will open a way for improvement. An inspiration for improvement is within easy reach, as one of the finest Jersey herds in the South is kept near Vicksburg, and the product, which is as well cared for as that from any practical dairy, is sold in Vicksburg.

Meridian, Miss.

Population, 14,050. Milk sold in city daily, not including product of family cows, 250 gallons. Number of family cows kept in the city indefinite, but runs into the hundreds.

The following are the prices for dairy products: Milk retails to consumers at 7½ cents per quart; in gallon lots to hotels, 25 cents per gallon; cream of indefinite quality, 30 to 40 cents per quart; ice cream, $1.50 per gallon. A large condensed milk trade is reported.

Some ice cream is shipped to Meridian from the northern part of the State. There is a very small cream trade. It is declared by a number of residents, who should know, that there is a plentiful supply of milk to meet all demands, and hotel managers state that they have no trouble in getting all the milk they want.

The health department has had supervision of the milk supply in a limited way for a short time. All dairies supplying milk to the city are required to secure a permit, and this permit makes it possible for the health department to require that certain sanitary conditions be observed in the handling of the milk and the stabling of the cows. The authorities claim that the death rate of infants has decreased materially since these regulations have been enforced.

Part of the milk sold in the city is bottled, and a small portion is cooled as it is milked; but most of the milk is delivered warm, and two deliveries per day are made, the cows being milked very early in the morning and afternoon. Two small dairies are inside the city limits and the remainder are on the outskirts. It is said that in no case is any attempt made to grow a portion of the feed consumed by the cows, cotton-seed products being about all the feed that the cows receive.

Natchez, Miss.

Population, 12,200. Milk sold daily, not including the product of family cows, 300 gallons. A large number of family cows are kept in the city, but no approximate estimate can be secured.

The following are the prices for dairy products in the city: Milk retails to consumers at 8 and 10 cents per quart, mostly 8 cents; to hotels and restaurants, 25 cents per gallon; a small trade in cream at 40 cents per quart; ice cream made from straight milk, $1.25 per gallon; containing 10 per cent of fat, $2 per gallon; fancy, $3 per gallon.

Two of the dairymen supplying milk to the city own good Jersey herds, and, as regards composition, the milk from these two herds is undoubtedly of excellent quality. There is no milk or dairy inspection, however, and a large part of

the milk sold in the city is said to be either skimmed or watered. From a sanitary standpoint, the milk sold in the city might be improved very much. Very little regard is paid to cleanliness in handling the milk, the dairymen seeming to be unacquainted with the first principles of handling milk. Practically all of the milk sold is delivered warm and supposedly fresh. The two Jersey herds are kept in good condition, being well fed and comparatively well cared for. Stables, as a rule, are miserably looked after. No green feed is fed to the cows and very little pasture is available. As in other cities visited by the writer, the cows are fed largely on cotton-seed products. A number of herds are kept in the city limits.

Natchez is badly in need of milk and dairy inspection, and such inspection should put particular emphasis on the handling of the milk and the sanitary condition of stables.

New Orleans, La.

Population, 287,104. Milk consumed in the city daily, 12,970 gallons; cream, 110 gallons.

The following are the prices for milk products: Milk, retail, to consumers, 7½ to 10 cents per quart; in gallon lots to hotels, 20 to 25 cents per gallon; paid by city dairies to rural producers, 10 to 16 cents per gallon, the dealer paying the freight; cream, 30 to 40 cents per quart; ice cream, $1.50 to $2 per gallon.

There are a number of features of the milk supply of New Orleans that make it one of the most interesting cities in this regard. The number of dairies within the city limits and the extent of the milk business they do are sufficient to stamp the city as unique. The effect that the milk and dairy inspection laws have had on the quality of the milk is worthy of notice, and there are a number of minor features aside from these that would attract attention.

New Orleans until within the last few years had the reputation of consuming the poorest milk of any city in the country, and, in fact, this reputation still clings to the city in the minds of many people unacquainted with the rapid change that has taken place there in the last few years. Whether the milk supply of the city was bad enough to warrant the repute in which it was held, or whether the bad conditions were magnified, is a matter for conjecture.

New Orleans gets the greater part of its milk from herds inside of the city limits. The last report of the board of health placed the number of such herds at 403, and the number of cows in these herds at 6,723. This did not include 18 herds just outside of the parish of New Orleans, but inside of a thickly populated portion. The greater number of these herds are in one section of the city, and it is likely that fully 4,000 cows are kept within a radius of a quarter of a mile. This close proximity to each other, of course, makes it impossible for the cows to have any pasture or even a large yard for exercise. As is well known, New Orleans is built on exceedingly level land which lies below the high-water mark of the Mississippi River. This makes it impossible to drain the land well during wet periods, and, as the soil is of a nature that works up into mud very easily, the condition of the yards used for the dairy herds must be bad beyond description in certain times of the year.

In comparison with this great number of local dairies, only 46 dairies outside of the city send milk by rail to New Orleans. Most of these dairies were formerly located in the city, but owing to difficult conditions moved out to a place called Hammond, about 40 miles from the city. Though they got away from the city, they did not get away from the old way of keeping cows; and, instead of taking the opportunity to raise a large part of the feed and reduce

expenses, they conduct the business the same way that the great majority of dairymen supplying milk to Southern cities would. They bought small lots of land, which were entirely insufficient to use for pastures, and so fed their cattle on purchased feeds. All this in a country where land was cheap, easily cultivated, and where a little manure added to the soil would grow green forage crops in quantities that would astonish Northern farmers. Instead of being a benefit to the milk supply, as it should have been, this movement into the country simply took the dairies that moved to Hammond out of the strict supervision of the board of health. It led to a few things, however, that were an improvement over former methods of handling the milk. The facts that the milk had to be shipped quite a distance and was several hours old before reaching the consumer, and that the inspectors make no allowance for an unfavorable climate and absolutely prohibit preservatives, have led to very careful treatment of the milk on the part of the producers. It necessarily has to be cooled to a low temperature where it is milked, and all utensils must be kept clean. These are two conditions which are not observed by the dairymen keeping herds in the city and suburbs.

As is mentioned above, the dairies and the milk are under very strict supervision by the board of health, the ordinances regulating the milk supply are comprehensive, and the dairymen bear witness by an unusual amount of complaining that these ordinances were rigidly enforced. The ordinances affecting the milk supply cover the following points: Milk must contain 3.5 per cent of fat and no preservatives; barns must be well ventilated, have 600 cubic feet of space for each cow, be whitewashed, and have water-tight floors. Barns, yards, and cows must be kept clean. Cans and bottles must be well washed, and bottles must not be refilled from cans in the wagons. All cows are tuberculin-tested. A good water supply must be insisted upon; and no distillery slops are allowed to be fed to cows. So far as could be observed these provisions are enforced by the inspectors. All stables are whitewashed and kept cleaner than similar stables furnishing milk to any other city in the country. There is one serious condition that the board of health has failed to remedy and can not improve, and that is the filthy yards attached to the stables. As was stated, this soil has a great tendency to work up into deep mud in wet spells, and the only possible way that this can be avoided is to provide sufficient space to allow the land to keep a good sod. This means that the cows must be pastured, and for this they will need to be removed outside of the city limits. An ordinance has already been passed which provides that all of these herds must be outside of the city by 1908. This is commendable in so far as the presence of these herds with attending filth is a menace to the health of the city; but if these herds simply remove to towns within shipping distance of New Orleans and, as is the case of the dairymen who have removed to Hammond, conduct their dairies on the same plan as is now being done in that city, it is difficult to understand how it will benefit the milk sold in the city. With the exception of one or two faults, which could be easily remedied, New Orleans is getting comparatively good milk at the present time. The milk and dairy inspectors have evidently worked wonders with the quality of the milk. It is not difficult to imagine what kind of milk was sold when no restraint was placed on the dairymen.

Most of the milk sold in New Orleans is delivered warm, fresh from the cow, but the milk and cream shipped in by rail is cold when delivered. Part of the milk is bottled, but most of it is sold from cans. These cans, holding from 10 to 15 gallons each, are carried in pairs in a type of milk cart peculiar to this city. It is a very high cart, carried on two wheels, and the cans are placed on a seat or shelf in front of the driver's seat. This vehicle was evi-

dently designed for a trade that required that the housekeeper should come to the street for the milk instead of the driver going to the door. For modern delivery of milk it would be hard to imagine a more awkwardly constructed delivery wagon than these two-wheeled carts.

There is a particularly good dairy located in a parish adjoining New Orleans. This is a sanitary dairy in the strictest sense of the word. The cows are properly fed and cared for, the stables are cleaned, and the milk is handled with all the care possible. It is very doubtful if any other money-making dairy in the country furnishes better milk than does this one. Though a higher price is charged for the milk produced in this dairy than any other dairy in the city, it is said that only a small part of the demand can be supplied. At the time of the visit of the writer there was a movement on foot to form a stock company to enlarge the herd and the amount of milk handled. If all the milk consumed in every city in the country was produced under such cleanly and healthy conditions and handled with the same regard for sweetness and purity, there would be no problems of city milk supply to be solved.

About the only suggestion that can be offered for the improvement of the milk sold in New Orleans is that the producers be required to cool the milk when it is milked. Such a regulation should not be difficult of enforcement. The board of health has undertaken and accomplished much more difficult tasks than this with regard to the dairies.

Baton Rouge, La.

Population, 11,269. Amount of milk sold in city daily, not including product of family cows, 150 gallons. A large number of family cows are kept in the city, but no estimate as to the number can be secured.

Milk retails at 25 to 35 cents per gallon retail and 25 cents per gallon to hotels. Cream sells for 40 cents per quart. There is not much ice cream trade and no buttermilk trade. The little cream sold is shipped in and is handled by grocery stores.

No bottled milk is sold, and practically all of the milk is delivered warm immediately after milking. Two of the dairy herds supplying milk for the retail trade are kept inside of the city. The others are in the country. With one or two exceptions, the herds in the country are confined in small yards, and have no pasture or green food of any kind. Cotton-seed products furnish practically all of the feed. The land around Baton Rouge is well drained and this prevents the yards from becoming so filthy as they might otherwise become; but there is no attempt on the part of the owners to keep the yards in good condition. The stables are very poor affairs, consisting principally of walls and a roof; no floors are provided.

One very interesting thing noted in connection with the dairy industry as it appears in this particular section is the fact that the dairymen allow the calf to suck the cow before milking in order to get the milk flow started. This requires that the calf of every cow be kept so long as the cow gives milk. As these calves are kept in very small, filthy pens, and are about half starved, they are not an attractive feature. Cows, as a rule, seem to be well fed and in good flesh. The labor conditions are very bad and consequently all of the work is done by the owner and his family. There seems to be a good demand for milk.

The city has no regulations governing the sale of milk or the care of dairies. Baton Rouge needs a milk and dairy inspection law, and until this is provided and enforced there is nothing that could be suggested that would improve conditions.

Memphis, Tenn.

Population, 102,320. Milk sold in city daily, 8,500 gallons; cream, 100 gallons daily.

The following are the prices for dairy products in Memphis: Milk, retail to consumers, 25 to 40 cents per gallon; cream, containing 30 per cent butter fat, 25 cents per quart; milk in gallon lots to hotels, 11 to 20 cents per gallon; ice cream, 80 cents to $1 per gallon; paid to producers for milk, 11 to 15 cents per gallon, plus freight; for cream, 30 cents per pound for contained butter fat, plus freight; buttermilk and skimmilk in large lots, 10 cents per gallon.

Most of the milk consumed in Memphis is produced on the outskirts of the city, though a little is shipped in by rail from a short distance. Nearly all of the cream used is shipped from Arkansas, a distance of 20 to 50 miles. A number—perhaps the majority—of the dairies in and around Memphis are what would be called city dairies, having only a small lot in which to keep the cows and no facilities whatever for raising any of the feed consumed by the cows. A few only of the dairies located outside the city raise practically all of the green feed necessary by a system of intensive farming. These dairies have learned how to handle milk as well as how to grow feed, and some of them would take rank almost as sanitary dairies. They have good milk rooms built separately from the stables, and the milk is drawn under very cleanly conditions and is cooled and bottled as soon as milked. At least one dairy had a pasteurizer, and subjected all the milk sold to this process. Milk from this dairy sold at 10 cents per quart, and it can be said to the credit of the consumers that it was impossible to meet the demand.

A very strict milk and dairy inspection law is rigidly enforced in Memphis. Milk is required to show 3.5 per cent of fat, and, according to the analyses submitted to the writer, the greater part of the milk contains above 4 per cent of butter fat, and a good portion runs better than 5 per cent. In fact, it appears that unusually rich milk is produced around Memphis, and the board of health insures rich milk for the consumer. The office in charge of the inspection inaugurated a practice of going directly to the herds and securing a sample of the fresh milk for comparison with the samples taken on the street whenever there was suspicion that all was not right. These comparative samples show highly interesting results, and the practice seems to have done much toward influencing public opinion and securing convictions. Inspectors visit herds and stables regularly. Stables are required to be whitewashed, and yards must have the manure scraped out during the wet season so as not to become filthy. The inspection has brought about a very good condition of affairs in this respect, except that the stables, as a rule, have very poor floors. Cows are well fed and appear to be perfectly healthy.

A part of the milk sold in the city is bottled and a part is cooled before it is delivered; but too much warm fresh milk is sold. Some of the dairymen make a pretense of cooling the milk by setting it in tubs of water, but, as the water is not very cool even when fresh, this is very ineffective. In fact, it is doubtful, considering all things, if it aids in the least in insuring good milk to consumers.

Few improvements can be suggested for the betterment of the milk. As stated above, there is too much warm milk delivered in the city. This could be easily remedied. Setting milk in a tub of water, unless it be ice water, is of doubtful benefit. The use of a mechanical cooler should be enforced. Dairymen should be required to have good floors in stables. This is fully as necessary as having stables whitewashed.

Chattanooga, Tenn.

Population, 30,154. Milk sold daily in city, 2,000 gallons. A large number of family cows.

The following are the prices for dairy products: Milk, retail to consumers, 24 to 30 cents per gallon; cream, containing 20 per cent butter fat, 25 cents per quart; milk to hotels in gallon lots, 16 to 20 cents a gallon; ice cream, 40 cents a quart, $1.25 a gallon; paid to farmers for milk, 15 cents per gallon.

Some of the milk consumed in Chattanooga is shipped as far as 60 miles, but the greater part is produced in the city or within a few miles of it. Several large dairies are within the city limits, and a number of herds are kept on farms where all of the green feed consumed is raised. There is no milk or dairy inspection, and stables and yards located in the city are in very bad condition.

Part of the milk sold in the city is bottled. A pasteurizing plant installed six years ago handles a large part of the milk sold in the city, and appears to be doing as good a business as the character of the milk sent by producers will permit.

Chattanooga is in need of inspection. In the absence of inspection it is impossible to suggest any improvements in the city milk supply. The city is situated in a place that should warrant the purest milk, as it does good water. It is a pity that the city should content itself with poor milk when it would be so easy to get good milk.

Knoxville, Tenn.

Population, 32,637. Milk consumed daily, excluding product of family cows, 1,000 gallons. No estimate of the number of family cows obtained.

The following are the prices for dairy products: Milk, retail to consumers, 6 to 8 cents per quart; to hotels and restaurants, 20 to 25 cents per gallon; cream, 30 cents per quart; ice cream, $1 to $1.25 per gallon.

Some milk is shipped a distance of 20 miles by rail into Knoxville, but the greater part of the milk is produced near the city. Knoxville is in an ideal country for dairying, but there is no particular evidence that the city milk supply is benefited by this fact. A couple of good dairies supply a small portion of the milk consumed. One of these is the State experiment station dairy. An expert is in charge of this dairy, and all modern appliances are used in caring for the milk. This milk goes to supply the better class of trade in the city. There is no milk or dairy inspection, and the majority of dairies take advantage of this fact to supply skimmed and watered milk. A small portion of the milk sold in the city is bottled and some is cooled, but the greater part of the trade is warm milk sold from cans. There is very little cream trade.

Knoxville is badly in need of an inspection ordinance that will cover both the source and the selling. The stables are very poor and are filthily kept. The milk receives no treatment whatever.

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